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AUTHOR Thomann, James
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ABSTRACT

In this speech, the author explains that metamethodology is a system designed to develop and test a methodology for a specific, definable purpose; and, as such, to provide for the development of, and the research into, methodologies. The paper begins with a brief clarification of the difference between methods and methodology and a discussion of the development and refinement of metamethodology. The main body of the document is concerned in detail with the seven basic steps of metamethodology: (1) State the purpose of the proposed methodology; (2) test the purpose by criteria such as its desirability, practicability, uniqueness, and operationability; (3) analyze the implications of the purpose; (4) operationalize the purpose; (5) design procedures; (6) test the procedures; and (7) revise the purpose and/or procedures, if necessary. The author contends that the steps should accomplish three things necessary to produce the best possible methodology for a definable purpose: (1) The determination of the purpose, (2) the development of the steps that make up the methodology, and (3) the testing of the methodology to see that it accomplishes the purpose. The complete methodology of metamethodology is shown in an appendix. (Author/DN)

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Meta-Methodology:
An Overview of What It Is and
How It Was Developed

by

James Thomann

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Methods and methodologies have been developed over the years to do many different things. Scientists - behavioral and physical - Engineers, Businessmen, laborers and even Teachers used methods to accomplish their purposes. Through the use of methods jobs are made easier to do, and better more consistent work is done.

For example, the physical scientists have the "Scientific Method" for doing research and establishing the results as knowledge. Any research that violates these methods is not accepted as valid by the particular scientific community. Another example of the use of methods comes from the field of Education. In order to earn a certificate to teach in either primary or secondary schools, a student usually has to take prescribed methods courses such as methods of teaching science, social studies, math and English. These courses usually attempt to show the students how to impart the subject matter to their students. Methods, good methods or bad methods, are constantly used by teachers.

There are many more examples of methods and methodologies being used or needed. In general there doesn't seem to be any field, job or area of endeavor that does not lend itself to the use of methods. For example, in the past ten years a new field has been created. This field is Futuristics. When the different aspects of this field were being explored, one of the most prominent divisions, where there was and is a great need, is the area of methods. This division supplies those things which are necessary in order to do futuristics.

Education, right after the Russians put Sputnik into orbit, heard a great call for more and better scientists in all areas of the physical sciences. In response to this call new curricula in physics, biology, math

and other fields were developed and disseminated. These curricula, not only included the subject matter, but also included methods to get across the subject matter. For example, PSSC physics emphasized the use of the lab to help the students learn the subject matter.

There is a difference between methods and methodologies. Methods are rules or procedures that guide someone in accomplishing a purpose. Methods consist of "rules of thumb" or "guidelines". Methodology, on the other hand, is a series of operational steps that accomplish a specific, definable purpose. The difference is that a methodology provides a specific, well-defined route that accomplishes the purpose while the method only supplies a possible route that is not well defined. A method only supplies direction to the user and leaves a lot for the user to supply; a methodology attempts to supply as much as possible to the user as far as operational procedures and sequence are concerned.

In the previous examples, one is dealing with methods rather than methodologies. The "Scientific Method" does not meet the definition of methodology because it does not present a series of operational steps, but a general set of steps that only gives the user the main steps in doing research. Teaching methods are only generalized approaches to teaching. At no time does a teaching method prescribe a specific behavior that the teacher should use in a specific situation. A methodology attempts to fill in all the missing pieces and thereby be able to prescribe what behavior is needed when.

Furthermore, a methodology can be looked at as an abstract but operational solution to a class of problems. It is abstract because it does not supply a specific solution to a specific problem but it supplies the means by which that specific problem is derived. It is operational because the steps by which the specific solution is determined are as prescriptive as

possible. A methodology deals with a class of problems. Any specific problem has particular characteristics that makes it similar to other problems. The steps of a methodology are designed on the general problem. In application, by accounting for the particular circumstances, a specific situation is designed for a specific problem. It is in this way that a methodology is an abstract but operational solution to a class of problems.

The need for methodologies has never been strongly perceived. This could be because methods are so much a part of what we do that we take them for granted. But the need is there and it is strong. With the way things keep changing either new or improved methods are needed. Occasionally this need is strongly perceived as happened in Education after Sputnik.

But in this proliferation of methodologies there has never been a methodology that provides for the development of, and research into, methodologies. In the past, any person who wanted to develop methodologies simply depended on his intuitive understanding of methodologies and his creative abilities. Given the low perception of need, and the fact that any method is better than none this lack of a conscious methodology for the creation of methodologies never appeared to be a hinderance. As a matter of fact in this absence a type of engineering came about whose practitioners were actually developers of methodologies. This field is industrial engineering. An industrial engineer develops methods to produce a better product in a more efficient way, thereby optimizing as much as possible the use of available resources.

Certain occurrences have pointed to the need for a methodology to develop and research methodologies. These occurrences include the need for an effective Evaluation Methodology and a Client Demand Methodology. The need for an Evaluation Methodology based on the purpose to provide data for decision-making has been documented by Larry Benedict (U.Mass. 1971).

The need for a Client-Demand Methodology based on the purpose to determine client demand for public services has been documented by Richard Coffing (U.Mass. 1971).

In attempting to fill the need for an Evaluation Methodology, the Fortune-Hutchinson Evaluation Methodology has been conceived and is being developed by Dr. Jimmie C. Fortune, Thomas E. Hutchinson et.al. In attempting to communicate how to develop and research this Evaluation Methodology the lack of an effective methodology to develop and research methodologies was perceived. This became even more evident when one attempted to learn or to teach how to develop and research methodologies.

It was to fill this gap that Dr. Hutchinson conceived of the concept of Metamethodology. This methodology has the purpose to develop and test a methodology for a specific, definable purpose. The first step taken was the conceptualization of the seven basic steps of Metamethodology. These were determined by Dr. Hutchinson and presented first by Richard Coffing in his dissertation proposal (U.Mass. 1971) which was concerned with the development of a Client Demand Methodology. These seven steps are:

- 1) State the Purpose
- 2) Test the purpose by criteria such as
 - a. Is it desirable?
 - b. Is it operationalizable?
 - c. Is it practicable?
 - d. Are existing methodologies insufficient?
- 3) If the answers are affirmative, then analyze the implications of the purpose.
- 4) Operationalize the purpose
- 5) Design procedures
- 6) Test the procedures
- 7) Revise the purpose and/or procedures, if necessary.

The next step of development came when Dr. Hutchinson and James Thomann decided to develop the methodology further. The reason for this undertaking was the desire of James Thomann to be able to develop and test methodologies and also be able to teach others to do the same. Since the above seven steps were all that existed of Metamethodology, it was determined that the development of Metamethodology was necessary in order to train other methodologists.

A two-part process was chosen to develop Metamethodology. First, the two developers decided to use the existing steps to develop a methodology on a given purpose. Wherever there was no specific procedure spelled out in Metamethodology, the developers would document as best they could the things they did to accomplish that particular step. After some study, both of areas of interest and need for methodology in these areas, the area of Futuristics was chosen and the purpose determined for the methodology was to provide information and data to decision makers on the consequences of the alternatives they face.

The second part of the development process was to use the existing steps of Metamethodology to fill in gaps in the Metamethodology itself. This was a process of using what existed of Metamethodology to develop itself. In this process the circular nature of Metamethodology is easily seen. This entire combined process has been compared to the process of evolution and because of its success, the developers have tried to make it an integral part of Metamethodology. This part is a combination of Field Test and Conceptual Development.

Five subsequent drafts of Metamethodology have been written since the first seven steps. In addition, there have been two drafts of the Future's Methodology produced. The sixth draft of Metamethodology is described in the following pages and the complete methodology (Draft I) is attached as an

appendix. Also attached as an appendix is the latest draft of the Future's Methodology.

Metamethodology has changed somewhat in its basic steps. There are still seven steps but through combination a number of steps have been put together and a couple of others added. Furthermore, all the steps have been expanded. It would be a mistake to say that Metamethodology is complete. There are still gaps to be filled, but the basic makeup of Metamethodology appears to be complete and only the further operationalization of the steps seem to be needed.

Previously it was mentioned that a methodology is an abstract but operational solution to a class of problems. Given that this statement is fact, then Metamethodology is an abstract but operational solution to the class of problems: all definable problems. The class of problems is all definable problems since Metamethodology provides for the development and testing of methodologies for any class of definable problems and therefore is a solution for all definable problems. The one constraint on Metamethodology is that the class of problems must produce a definable purpose, which when accomplished solves the problem.

There are three things that are necessary to produce the best possible methodology for a definable purpose: 1) the determination of the purpose; 2) the development of the steps that make up the methodology; 3) the testing of the methodology to see that it indeed accomplishes the purpose. In the seven steps Metamethodology (Draft VI) accomplishes the three things listed above. What follows then is an explication of the seven steps of Metamethodology. Each step will be described conceptually, but no attempt will be made to totally describe each step since the complete methodology is an appendix to this paper.

The first step is to put the methodologist into contact with the

problem. This step identifies in one of two ways the area in which a methodology is needed. The simple way is to use the interests of the methodologist and the complex method is to do a Client Demand Study using Coffing's Client Demand Methodology.

Step II is to determine the purpose around which a methodology is to be developed. This is accomplished by doing as thorough an investigation of the problem area as is possible. In doing this investigation, the nature of the problem area to be determined. By determining the nature of the problem area one has begun to identify what it means to work in the area. From this process, one can then determine a purpose for which to build a methodology in order to solve the problem. At this writing this step is one of the least developed steps of Metamethodology. There is no process of investigation that the developers feel is superior to any other. For that matter, no specified process yet exists for this activity.

In step III the purpose is tested against four criteria. The first criteria is desirability. By this criteria, one attempts to determine if the methodology developed around the purpose will accomplish something people want and will use. For if the purpose is undesirable then producing a methodology that will accomplish this purpose might be a waste of time.

Operationability is the second criteria. By this criteria, it is determined if the purpose can be made operational and thereby be totally understood. It is not necessary to operationalize the purpose at this time, but only determine if it can be made such since an operational purpose is necessary for later stages of the methodology, and since a purpose that is not operational may be unsolvable.

Next, one determines if the purpose is practical. Practicability, first, calls for a determination as to whether a methodology can be developed, given the resources available for the development. It might be unwise to begin work on a methodology when there are not sufficient resources to

complete the developmental tasks. Secondly, practicability calls for the determination as to whether the methodology implied by the purpose can be applied practically, once it is developed. If the methodology cannot be applied practically then there is a good chance it can not be used or will not be used.

The final criteria against which the purpose is tested is the insufficiency of existing methodologies for the accomplishment of that purpose. This criteria is used to make sure that time and resources are not wasted developing and testing a methodology for the chosen purpose that does the same thing in a way it accomplishes the purpose or in that it does not do a better job of accomplishing the purpose than existing methodologies designed for the same purpose. This criteria can also help save time and resources by identifying gaps in the existing methodology. If any of the above criteria do not test positively then the purpose is reworked or all work on the methodology halted, depending on the extent of the risk, and resources available to the methodologist.

The fourth step of metamethodology is designed to produce the skeleton outline of the methodology. After the completion of this step one can have a pretty good idea of what the final methodology will look like. First, the methodologist analyzes the implications of the purpose and then organizes these implications into a rational order of steps. This is done because it produces the first approximation of the gross methodological elements, for as Dr. Hutchinson said, "Every problem implies its own solution." (1971) The methodologist would then add in any necessary steps that are on the same level of operationalization, but were not part of the implications. This is done because there is no guarantee that the implications will produce the entire skeleton. For example, transitional steps might be needed in order to make the methodology workable. Finally, the very first and very last steps are determined and added to the methodology if they are not already there.

Next, the methodologist operationalizes the purpose if it was not done in step III above. This is necessary in order to carry out the last two steps of Metamethodology. Since the last two steps provide for the full development and testing of the methodology, objective criteria are needed against which to judge and test the methodology. By operationalizing the purpose the methodologist procludes the necessary criteria. This is why it is so important to test the purpose for operationalizability, since otherwise it would be difficult to produce the necessary criteria at this step.

Step VI provides for the further design of the methodology. Through this step at least one, if not most, of the gaps of the methodology are filled. The step is divided into two basic sections with a recycling component. The first part is to identify a gap (gaps) and design the steps to fill it. These substeps are designed by determining a subpurpose to fill the gap and then by analyzing the implications of the subpurpose the substeps are developed. The second part of the step provides for a logical testing of the newly developed substeps in terms of their internal logic of the developed substeps and in terms of the whole methodology by using the criteria produced in step V. It is important that both logical tests are passed, since it can not be just assumed that the newly developed steps will be logically consistent. The recycling component provides for the steps under development to go through redesign until they appear to satisfy the criteria. And it also provides for the methodology to be recycled until either all the gaps are provided for or until the methodologist feels he cannot sufficiently improve the methodology to warrant using any more resources on this step.

Finally, Metamethodology provides for field testing and conclusion-oriented research of the methodology. A field test is a controlled use of the methodology that provides data for further design or redesign of parts of the methodology. Conclusion-oriented research is the testing of hypotheses about the methodology. Again, these are done in terms of the

criteria produced in Step V. This step also has a recycling component. The recycling puts the methodology back into step VI to solve the problems identified by the testing or research.

At this point in time there is no rigidity in the order of steps. For example, Step V can be done when it is needed since some methodologists might find it more appropriate to do this step earlier or later than specified. Even though rigidity is not there, it is recommended that the methodologist follow the methodology unless his experience determines a better way. One reason that this lack of rigidity exists is because Metamethodology is still under development.

Furthermore, it should be noted that Steps VI and VII can be going on simultaneously. This can be done because step VII can help the methodologist identify the gaps and step VI provides steps that can be tested by step VII to assist in the development of these steps. Research, either field testing or conclusion-oriented, can be done on any part of the methodology as well as on the whole. As was previously mentioned it is this simultaneous use of steps VI and VII that has helped develop Metamethodology and is also being used quite successfully in the development of the Fortune-Hutchinson Evaluation Methodology.

The development of Metamethodology is a significant breakthrough in the field of methodological research and development. It not only provides the procedures by which methodological research and development are done, but it also provides a definition or understanding of the field. Until now training in the field was almost non existent, but with Metamethodology the training of methodologists becomes a real possibility.

In conclusion it should be remembered that Metamethodology is not yet finished. There are still gaps to be filled and research to be done. Some of the more notable gaps, although not necessarily the most important,

are steps II and VII. More work and further research are necessary. The developers, though, do believe that a workable methodology is now in existence and with the additional work Metamethodology will achieve the goal of being able to produce the best, most efficient processes to accomplish purposes.

Appendix
Metamethodology
Draft VI*

Tom Hutchinson/Jim Thomann
February, 1972

- I. Put methodologist in contact with problem using one of two methods:
 - A. Simple method - use interests of the methodologist
 - B. Complex method - use Coffing Client - Demand Methodology
- II. State the purpose of analyzing the area and determining a purpose that will solve the problem.
 - A. Investigate the Problem Area
 - 1. Read the literature in the area.
 - 2. Talk to people who work in the area.
 - 3. Examine work being done in the area.
 - 4. Brainstorm about the Problem Area.
 - 5. Try out tools hhat already exist in Problem Area.
 - B. Narrow down Area into manageable piece (Focus).
 - C. Investigate purposes within the chosen piece of the Problem Area
 - 1. Brainstorm purposes that will solve the chosen problem.
 - 2. Read the literature applicable to the chosen problem.
 - 3. Ask others for purposes they think will solve the chosen problem.
 - D. If more than one purpose has resulted from the previous step, then choose the most appropriate one.
 - E. Check chosen purpose against following two criteria
 - 1. Check purpose to see that it is not trivial.
 - 2. Check purpose to see if it really solves the problem you have in mind.

*The Developers heartily thank Phillip Brooks, whose class notes were of great help in producing this Draft of Metamethodology.

3. If purpose fails to meet one of the above criteria revise it until it meets them both.
- F. If resources warrant show purpose to others for their critique based on the above two criteria.
- G. Write out purpose and commit yourself to it. [If you can say why you don't like it, then you revise and recycle to E. If you can't say why you don't like it then go on to step III].

III. Test the purpose by the following criteria.

- A. Is purpose desirable?
 1. Use one of the following methods - where not obvious use Complex Method.
 - a) Simple Method
 - i) Answer question yourself with rationale
 - ii) Get diverse groups to answer question
 - b) Complex Method - use Coffing Client - Demand Methodology
 2. Revise the purpose if necessary.
- B. Is purpose operationalizable?
 1. Use "Operationalization of Fuzzy Concepts"

N.B. It is not necessary to do a complete operationalization at this point. It is only necessary to find out if the purpose can be operationalized.
 2. Check A in light of Operationalization and revise if necessary.
- C. Is purpose practicable?
 1. Answer question yourself in terms of
 - a) Is the development of a methodology practical given purpose?
 - b) Is the methodology once developed a practical way to accomplish the purpose?
 2. Get diverse groups to answer question
 - a) Methodologists answer question of (C.1.a)
 - b) Methodologists and potential users answer question of (C.1.b.)

3. Revise the purpose if necessary and recycle through A and B otherwise go to D.

D. Are existing methodologies insufficient?

1. Test in following way:

- a) Search area for existing methodologies
- b) Take found methodologies and test them against definition of methodology. If they all fail go to Step IV.
- c) Are they designed to accomplish your purpose? If not go to Step IV.
- d) Do any one of them accomplish you/purpose? If not go to Step IV.
- e) Are these practical (see if it is used). If not go to Step IV.
- f) Are they desirable? If all are not, go to Step IV.
- g) Is it complete? (You may work on it if it is not).

2. Revise the purpose and recycle through tests if necessary.

IV. Once all answers to III are yes, then analyze implications of the purpose for the development of methodology (This is a way of identifying the attributes that the methodology must have.)

A. Use following method to analyze implications (Hutchinson says "Problem implies its own solutions." In this case, the implications of the purpose supplies first approximation of gross methodological elements.)

1. a) Imagine and write down in what ways you could fail to accomplish the purpose.
- b) Imagine and write down in what ways you can accomplish the purpose, avoiding all the problems.
- c) Imagine the purpose being accomplished, write down what is happening.
- d) i) For each element determined thru b + c, determine all possible alternatives to accomplish the purpose.
- ii) Combine two lists into one: turn alternatives from a. around so they fit together with list from d.i)
- iii) Test the completeness of above list using one or more of the following methods.

- 1) Ask others to do steps a-c
 - 2) Think up alternatives which have nothing to do with this purpose and consider whether they do or not.
 - 3) Go back to list generated in b and c, and consider again whether any of those should be on list and add any new ones.
 - 4) Ask yourself if your alternatives have any alternatives to them.
 - 5) Ask what bad alternatives exist that are not on this list and how they could be changed to good alternatives.
 - 6) Use any other tests of your own choosing.
2. If at this point you cannot choose one of the alternatives on the basis that there is some reason to believe that it will best accomplish the purpose then do a + b. Otherwise combine all lists to come out with one list - where there are alternatives choose one.
- a) Determine your value system.
 - b) Use value system to turn list into a list of all positive alternatives. In other words if one of the alternatives is one that is contradictory or non-desirable use values to change it so it is not.
- B. Organize the attributes into a rational order of steps.
1. Determine which implications are not necessary for the methodology (accomplishing purpose) and strike them from list.
 2. Determine which implications are contained in others and note that. Determine which implications can be combined to make one step, and give those a name.
 3. Ask which implications would he/she have to accomplish first in order to accomplish the rest.
 4. Write it out as first step.
 5. Ask which implication would now be first given the first one is accomplished.
 6. Write down as second step.
 7. Do this process until all major implications are accounted for.

8. Order any substeps by cycling through 3-7.
 9. Check to see if order has logical flow to it.
 10. Check to make sure all implications are stated procedurally.
 11. Write out a revised list.
 12. Check completion of ordering by asking others (at least one) to give an ordering of implications with explanation of why, if possible, without showing them his ordering. This can be verbal or written, depending on the resources available.
 13. Do a revised ordering based on responses from 11.
 14. Give a revised ordered list to others experienced in problem area and ask them to critique it.
 15. Do a final ordering and write it out.
- C. Add in any steps or functions that are implied by the existing steps at the same level of abstraction.
- D. Identify Anchoring Steps for Methodology
- (1. Putting Methodologist in contact with problem.
 2. Testing if methodology has worked (then recycle).)
- E. Write out final list to be used throughout rest of methodology.
- V. Operationalize the purpose.
- A. If the purpose is vague use "The Operationalization of Fuzzy Concepts", otherwise use B.
 - B. Use the straight analysis technique.
- VI. Design Procedures
- (N.B. Design or Re-design can be done at any level of breakdown including the highest).
- A. Identify the first (next) step to be designed (i.e. the first crucial step where it is not clear that the step would be easy to develop. Use the criteria developed in Step V to determine whether the step is crucial or not.
 - B. Identify the step's subpurpose.
 - C. Analyze implications of subpurpose in terms of main purpose by using the procedures stated below.

a. Use the following method to analyze implications of the subpurpose.

1. a) Imagine and write down in what ways you could fail to accomplish the purpose.
- b) Imagine and write down in what ways you can accomplish the purpose, avoiding all the problems.
- c) Imagine the purpose being accomplished, write down what is happening.
- d) i) For each element determined thru b + c, determine all the possible alternatives to accomplish the purpose.
- ii) Combine two lists into one: turn alternatives from a. around so they fit together with list from d.i)
- iii) Test the completeness of above list using one or more of the following methods.
 - 1) Ask others to do steps a-c
 - 2) Think up alternatives which have nothing to do with this purpose and consider whether they do or not.
 - 3) Go back to list generated in b and c, and consider again whether any of those should be on list and add any new ones.
 - 4) Ask yourself if your alternatives have any alternatives to them.
 - 5) Ask what bad alternatives exist that are not on this list and how they could be changed to good alternatives.
2. If at this point you cannot choose one of the alternatives on the basis that there is some reason to believe that it will best accomplish the purpose then do a + b. Otherwise combine all lists to come out with one list - where there are alternatives choose one.
 - a) Determine your value system.
 - b. Use value system to turn list into a list of all positive alternatives. In other words if one of the alternatives is one that is contradictory or non-desirable use values to change it so it is not.

b. Organize the attributes into a rational order of steps.

1. Determine which implications are not necessary for the methodology (accomplishing purpose) and strike them from list.
2. Determine which implications are contained in others and note that. Determine which implications can be combined to make one step and give those a name.
3. Ask which implication would he/she have to accomplish first in order to accomplish the rest.
4. Write it out as first step.
5. Ask which implication would now be first given the first one is accomplished.
6. Write down as second step.
7. Do this process until all major implications are accounted for.
8. Order any substeps by cycling through 3-7.
9. Check to see if order has logical flow to it.
10. Check to make sure all implications are stated procedurally.
11. Check completion of ordering by asking others (at least one) to give an ordering of implications with explanation of why, if possible, without showing them his ordering. This can be verbal or written, depending on the resources available.
12. Do a revised ordering based on responses from 11.
13. Give revised ordered list to others experienced in problem area and ask them to critique it.
14. Do a final ordering and write it out.

c. Add in any steps or functions that are implied by the existing steps at the same level of abstraction.

d. Identify Anchoring Steps for Methodology.

e. Write out final list to be used throughout the methodology

D. Determine the amount of completeness and test for it

E. Examine the logic of the step under design in terms of subpurpose and main purpose.

- F. Fill in the gaps that are found and then recycle to VI E. If no gaps go on to VI G.
- G. Examine the logic of entire methodology and its parts in terms of main purpose in light of the step under development.
- H. Redesign step and/or methodology and recycle to VI G. If no gaps then go to VI I.
- I. Recycle to VI A until one feels that further applications of VI will not produce sufficient improvement to warrant spending of resources. One may also go on to VII A as well as go back to VI A.

VII. Test and then revise the purpose and/or procedures if necessary.

- A. Field test methodology; if necessary, redesign (Use Step VI).
- B. Conclusion oriented research of methodology; if necessary redesign (Use Step VI).